

Package ‘varSel’

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Type Package

Title Sequential Forward Floating Selection using Jeffries-Matusita Distance

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Description Feature selection using Sequential Forward Floating feature Selection and Jeffries-Matusita distance. It returns a suboptimal set of features to use for image classification. Reference: Dalponte, M., Oerka, H.O., Gobakken, T., Gianelle, D. & Naeset, E. (2013). Tree Species Classification in Boreal Forests With Hyperspectral Data. IEEE Transactions on Geoscience and Remote Sensing, 51, 2632-2645, <[DOI:10.1109/TGRS.2012.2216272](https://doi.org/10.1109/TGRS.2012.2216272)>.

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LazyData TRUE

RoxygenNote 7.1.1

NeedsCompilation no

Repository CRAN

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BHATdist	<i>Bhattacharyya distance among classes</i>
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Description

Bhattacharyya distance.

Usage

```
BHATdist(g, X)
```

Arguments

g	A column vector of the lables. length(g) is equal to nrow(X).
X	A dataframe of the features. ncol(X) is equal to the total number of features, and nrow(X) is equal to the number of avaialble training samples. nrow(X) is equal to length(g)

Value

A list containing a matrix of the class combinations and a vector of the Bhattacharyya distances of all the class combinations.

Author(s)

Michele Dalponte and Hans Ole Oerka

References

Dalponte, M., Oerka, H.O., Gobakken, T., Gianelle, D. & Naesset, E. (2013). Tree Species Classification in Boreal Forests With Hyperspectral Data. IEEE Transactions on Geoscience and Remote Sensing, 51, 2632-2645.

dat	<i>Hyperspectral data acquired over a forest area</i>
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Description

A dataset containing 3230 samples with 65 hyperspectral bands and 8 classes.

Usage

```
data(dat)
```

Format

A data frame with 3230 rows and 66 variables

Details

- B1...B65 Hyperspectral bands.
- SP. Classes.

JMdist

*Jeffries-Matusita distance among classes***Description**

Jeffries-Matusita distance.

Usage

```
JMdist(g, X)
```

Arguments

- | | |
|----------------|--|
| <code>g</code> | A column vector of the labels. <code>length(g)</code> is equal to <code>nrow(X)</code> . |
| <code>X</code> | A dataframe of the features. <code>ncol(X)</code> is equal to the total number of features, and <code>nrow(X)</code> is equal to the number of available training samples. <code>nrow(X)</code> is equal to <code>length(g)</code> |

Value

A list containing a matrix of the class combinations and a vector of the JM distances of all the class combinations.

Author(s)

Michele Dalponte and Hans Ole Oerka

References

Dalponte, M., Oerka, H.O., Gobakken, T., Gianelle, D. & Naesset, E. (2013). Tree Species Classification in Boreal Forests With Hyperspectral Data. IEEE Transactions on Geoscience and Remote Sensing, 51, 2632-2645.

varSelSFFS	<i>Sequential Forward Floating Selection using Jeffries-Matusita Distance</i>
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Description

Feature selection using the Sequential Forward Floating Selection search strategy and the Jeffries-Matusita distance.

Usage

```
varSelSFFS(g, X, strategy = "mean", n = ncol(X))
```

Arguments

<code>g</code>	A column vector of the labels. <code>length(g)</code> is equal to <code>nrow(X)</code> .
<code>X</code>	A dataframe of the features. <code>ncol(X)</code> is equal to the total number of features, and <code>nrow(X)</code> is equal to the number of available training samples. <code>nrow(X)</code> is equal to <code>length(g)</code> .
<code>strategy</code>	string indicating the multiclass strategy to adopt: 'minimum' or 'mean'.
<code>n</code>	integer indicating the number of features to select. The algorithm will stop at <code>n+1</code> features selected.

Value

A list containing a vector of the JM distances on the individual bands, a matrix with the set of features selected, and a vector containing the distances for each feature set from 1 to `N-1`, where `N` is equal to `ncol(X)`.

Author(s)

Michele Dalponte and Hans Ole Oerka

References

Dalponte, M., Oerka, H.O., Gobakken, T., Gianelle, D. & Naesset, E. (2013). Tree Species Classification in Boreal Forests With Hyperspectral Data. *IEEE Transactions on Geoscience and Remote Sensing*, 51, 2632-2645.

Examples

```
## Not run:
data(dat)

se<-varSelSFFS(g=dat$SP,X=dat[,c(1:65)],strategy="mean",n=4)
summary(se)

## End(Not run)
```

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